

22.39 HW#9 (Due: Fri. Dec. 8, 2006)

Fall 2006

PROBLEM STATEMENT

Please limit your answer to each of these questions to ½ page (total of 2 pages).

1. Fission products and neutrons are two of energetic particles produced as a result of the fission process. Discuss the interactions of these two different particles with the fuel (fission product) and the fuel cladding and structural materials (neutrons) for all reactor types that can be covered as a single answer.
2. Discuss the effect of irradiation time on radiation damage imposed upon (a) fuel element cladding, and (b) pressure vessels of light water reactors.
3. Irradiation induced swelling is an important phenomena for materials performance in a neutron environment. Discuss the important variables that determine a material's susceptibility to swelling.
4. Stress corrosion cracking (SCC) is one of the most important environmental degradation phenomena for LWR systems. List and discuss the key factors involved in the SCC process. Include the effect of radiation.